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Feasibility of Developing Alberta Gypsum
Deposits. June 1968. 1



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PROVINCE OF ALBERTA

CANADA

THE FEASIBILITY OF DEVELOPING

ALBERTA GYPSUM DEPOSITS

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Alberta

DEPARTMENT OF INDUSTRY AND COMMERCE

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Department of Industry & Commerce
June, 1968

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Summary

There appears to be a reasonable opportunity to establish a gypsum products industry in Edmonton.

- Edmonton has an advantageous location for the growing markets of northern Alberta and northern Saskatchewan.
- At present all gypsum is imported from British Columbia and Manitoba.
- New railway lines and new roads north of Edmonton, should make development more feasible and transportation costs lower.
- There is a large cement industry in the Edmonton metropolitan area which requires gypsum.
- Population growth in the northern Alberta and northern Saskatchewan market area is one of the most rapid in Canada thus leading to rapid increases in the size of the market.

There appears to be a reasonable opportunity to establish a typical business industry in Edmonton.

Edmonton has an advantageous location for the growing industry of northern Alberta and northern Saskatchewan.

All business all types is expected from British Columbia and Manitoba.

New railway lines and new roads built in Edmonton, should make development more feasible and transportation costs lower.

There is a large amount industry in the

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Development Considerations

1. Market Potential

(a) Residential Construction

During each of the last nine years (1959-1967) an average of 4,948 homes have been completed in northern Alberta. The corresponding figure for northern Saskatchewan is 1,662 completions. (Tables I and II)

The slow growth of housing completions during the last several years is probably the result of the bottleneck in the construction industry as well as the rapidly rising interest rates. Since population growth has been rapid, one would expect the long run prospect of increases in completions to be good.

Nearly all residential units require some type of gypsum wallboard in their construction; either as drywall board finish, or gypsum lath which is plaster finished.

From consultations with officials of the Central Mortgage and Housing Corporation, the Building Inspection Department of the City of Edmonton and private contractors, it was learned that approximately 90 per cent of the dwelling units built in 1964 used drywall construction. In this same year, the average size bungalow built in Edmonton (under an N. H. A. mortgage) was 1,108 square feet.

Assuming an average size of 1,100 sq. ft. floor area per unit, there would be approximately 4,500 sq. ft. of $\frac{1}{2}$ " hardwall used for walls and ceilings. (See Table III)

(b) Non-Residential Construction -

It is impossible to estimate with any confidence the amount of gypsum wallboard (lath and drywall) which is used in non-residential construction.

This type of construction is so varied and includes so many different types of buildings and structures that a generalization on the consumption of a particular product is impossible. Therefore, all estimates in this report exclude non-residential construction.

It is known, however, that gypsum wallboard is widely used in commercial construction, particularly in partitioning of office space.

Edmonton's building code specifies that a fireproof material must be used in partitioning of commercial buildings and $\frac{1}{2}$ " gypsum wallboard is designated as an acceptable material.

For the value of residential and non-residential construction in Metropolitan Edmonton, and other cities in northern Alberta and northern Saskatchewan (See Tables IV, V and VI).

(c) Cement Users -

The cement plants in Alberta used approximately 41,000 tons of gypsum in 1967. (See Tables VII and VIII).

2. Transportation:

Transportation costs are important in the gypsum industry. Both raw gypsum and most gypsum products have a high weight/value ratio. It is therefore desirable, to have both the mining of raw gypsum and the manufacture of gypsum products as near as possible to major markets. (See Table IX).

3. Mining:

A separate engineering study would be required to determine exact mining costs at any location in Alberta. These mining costs, together with freight rates would then serve as a basis for comparison to the existing sources of supply.

4. Competition:

The quantity of gypsum used in Alberta is increasing. (See Table X). Presently, there are two plants manufacturing gypsum products at Calgary. Domtar Construction Materials Ltd., (Formerly Gypsum Lime and Alabastine Ltd.) obtains its raw gypsum from Gypsumville, Manitoba. Western Gypsum Products Ltd., is supplied from Windermere, British Columbia. (See Table XII).

TABLE I

CONSTRUCTION OF DWELLING UNITS
CENTRES OF 5,000 POPULATION AND OVER
NORTHERN ALBERTA, 1959-1967

- units completed -

| <u>Year</u> | <u>Camrose</u> | <u>Edmonton (metro)</u> | <u>Grande Prairie</u> | <u>Lloyd- minster</u> | <u>Red Deer</u> | <u>TOTAL</u> |
|-------------|----------------|-----------------------------|---------------------------|---------------------------|---------------------|--------------|
| 1959 | 59 | 4,995 | 59 | 50 | 312 | 5,475 |
| 1960 | 85 | 3,328 | 72 | 27 | 227 | 3,739 |
| 1961 | 67 | 3,212 | 84 | 34 | 328 | 3,725 |
| 1962 | 72 | 5,157 | 197 | 31 | 444 | 5,901 |
| 1963 | 81 | 4,960 | 238 | 47 | 468 | 5,794 |
| 1964 | 94 | 4,837 | 181 | 39 | 503 | 5,654 |
| 1965 | 83 | 4,226 | 97 | 63 | 205 | 4,674 |
| 1966 | 53 | 4,478 | 80 | 51 | 87 | 4,749 |
| 1967 | 80* | 4,477 | 125 | 55* | 70 | 4,807 |

* Figures for centres under 10,000 Population not available after 1966.
Figures are therefore estimates.

9 Year Average (1959 - 1967) Unit Completions: 4,948

SOURCE: "New Residential Construction",
Catalogue Number 64 - 002,
Dominion Bureau of Statistics.

TABLE II

CONSTRUCTION OF DWELLING UNITS
IN URBAN CENTRES OF 5,000 POPULATION AND OVER
NORTHERN SASKATCHEWAN, 1959-1967

- units completed -

| <u>Year</u> | <u>Lloyd- minster no.</u> | <u>North Battleford no.</u> | <u>Prince Albert no.</u> | <u>Saskatoon no.</u> | <u>TOTAL no.</u> |
|-------------|-----------------------------------|-------------------------------------|----------------------------------|--------------------------|----------------------|
| 1959 | 4 | 135 | 271 | 1,325 | 1,735 |
| 1960 | 26 | 101 | 178 | 1,548 | 1,853 |
| 1961 | 20 | 116 | 187 | 1,209 | 1,532 |
| 1962 | 11 | 92 | 222 | 1,123 | 1,448 |
| 1963 | 17 | 85 | 169 | 788 | 1,059 |
| 1964 | 19 | 115 | 251 | 1,261 | 1,646 |
| 1965 | 55 | 117 | 144 | 1,806 | 2,122 |
| 1966 | 39 | 93 | 237 | 1,336 | 1,705 |
| 1967 | 37* | 55 | 336 | 1,434 | 1,862 |

* Figures for centres under 10,000 Population not available after 1966. Figures are therefore estimates.

9 Year Average (1959-1967) Unit Completions: 1,662

SOURCE: "New Residential Construction",
Catalogue Number 64 - 002,
Dominion Bureau of Statistics.

TABLE III

ESTIMATE OF GYPSUM WALLBOARD USED IN
RESIDENTIAL CONSTRUCTION IN NORTHERN ALBERTA
AND NORTHERN SASKATCHEWAN, 1967

| | | |
|---|-------|--------------------------|
| Yearly Average Number of Dwelling Units Completed in Northern Alberta in each of the past 9 year (1959-1967) (Table 1) | | 4,948 Units |
| 90% of Dwelling Units finished with $\frac{1}{2}$ " Drywall | | |
| .90 x 4,948 = 4,453 | | |
| 4,453 x 4,500 sq. ft. of Drywall | = | 20,038,500 sq. ft. |
| 10% of Dwelling Units finished with Plaster using Gypsum Lath | | |
| .10 x 4,948 = 490 | | |
| 490 x 4,500 sq. ft. of Gypsum Lath | = | <u>2,205,000 sq. ft.</u> |
| | TOTAL | 22,243,500 |
| Approximately 22,243,500 sq. ft. at an average price to contractors of \$85.00 (*) per thousand square feet | | = \$ 1,931,625 |
| (*) Jobber Price to Contractors from Suppliers for $\frac{1}{2}$ " wallboard. | | |

| | | |
|--|--|-------------|
| Yearly Average Number of Dwelling Units Completed in Northern Saskatchewan in each of the past 9 years (1959-1967) (Table II) | | 1,662 Units |
|--|--|-------------|

Assuming that the same breakdown applies in
Northern Saskatchewan, the quantity and value of
Gypsum Wallboard consumed in residential
construction would approximate 7,479,000 sq. ft.
costing \$635,715.

The total market for Gypsum Wallboard in Northern Alberta
and Northern Saskatchewan appears to be in excess of
\$2.5 million per annum.

TABLE IV

VALUE OF RESIDENTIAL AND NON-RESIDENTIAL
CONSTRUCTION, METROPOLITAN EDMONTON,
1959 - 1967

| | Total Residential | Industrial | Commercial | Institutional & Government | Other | Total Non-Residential | Total Residential & Non-Residential |
|------|----------------------|------------|------------|-------------------------------|---------|--------------------------|--|
| | \$ '000 | \$ '000 | \$ '000 | \$ '000 | \$ '000 | \$ '000 | \$ '000 |
| 1959 | 48,842 | 4,863 | 17,901 | 22,736 | 290 | 45,790 | 94,632 |
| 1960 | 30,053 | 4,268 | 14,110 | 21,530 | 135 | 40,043 | 70,096 |
| 1961 | 54,899 | 9,862 | 12,713 | 12,611 | 135 | 35,321 | 90,220 |
| 1962 | 59,713 | 5,783 | 19,091 | 28,486 | * | 53,360 | 113,073 |
| 1963 | 58,431 | 4,266 | 19,074 | 17,100 | * | 40,440 | 98,871 |
| 1964 | 49,625 | 9,487 | 26,300 | 28,710 | * | 64,497 | 114,122 |
| 1965 | 45,630 | 6,561 | 17,808 | 70,657 | * | 95,026 | 140,656 |
| 1966 | 52,190 | 7,895 | 30,776 | 43,522 | * | 82,193 | 134,373 |
| 1967 | 67,196 | 10,191 | 24,497 | 46,661 | * | 81,349 | 148,545 |

(*) Since 1962 no separate column has been provided for other construction.

SOURCE: "Building Permits",
Catalogue Number 64 - 001,
Dominion Bureau of Statistics.

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| Population Size | Number of Populations |
|-----------------|-----------------------|
| 0-10,000 | 100 |
| 10,000-20,000 | 150 |
| 20,000-30,000 | 120 |
| 30,000-40,000 | 180 |
| 40,000-50,000 | 140 |
| 50,000-60,000 | 160 |
| 60,000-70,000 | 130 |
| 70,000-80,000 | 170 |
| 80,000-90,000 | 150 |
| 90,000-100,000 | 190 |
| 100,000-110,000 | 160 |
| 110,000-120,000 | 140 |
| 120,000-130,000 | 120 |
| 130,000-140,000 | 110 |
| 140,000-150,000 | 100 |
| 150,000-160,000 | 90 |
| 160,000-170,000 | 80 |
| 170,000-180,000 | 70 |
| 180,000-190,000 | 60 |
| 190,000-200,000 | 50 |
| 200,000-210,000 | 40 |
| 210,000-220,000 | 30 |
| 220,000-230,000 | 20 |
| 230,000-240,000 | 15 |
| 240,000-250,000 | 10 |
| 250,000-260,000 | 8 |
| 260,000-270,000 | 6 |
| 270,000-280,000 | 4 |
| 280,000-290,000 | 3 |
| 290,000-300,000 | 2 |
| 300,000-310,000 | 1 |
| 310,000-320,000 | 1 |
| 320,000-330,000 | 1 |
| 330,000-340,000 | 1 |
| 340,000-350,000 | 1 |
| 350,000-360,000 | 1 |
| 360,000-370,000 | 1 |
| 370,000-380,000 | 1 |
| 380,000-390,000 | 1 |
| 390,000-400,000 | 1 |
| 400,000-410,000 | 1 |
| 410,000-420,000 | 1 |
| 420,000-430,000 | 1 |
| 430,000-440,000 | 1 |
| 440,000-450,000 | 1 |
| 450,000-460,000 | 1 |
| 460,000-470,000 | 1 |
| 470,000-480,000 | 1 |
| 480,000-490,000 | 1 |
| 490,000-500,000 | 1 |

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TABLE V

VALUE OF RESIDENTIAL AND NON-RESIDENTIAL CONSTRUCTION
IN URBAN CENTRES OF 5,000 POPULATION AND OVER
NORTHERN ALBERTA, 1959 - 1967

| CAMROSE | | | | | | |
|---------|----------------------|------------|------------|-------------------------------|--------------------------|--|
| | Total Residential | Industrial | Commercial | Institutional & Government | Total Non-Residential | Total Residential & Non-Residential |
| | \$'000 | \$'000 | \$'000 | \$'000 | \$'000 | \$'000 |
| 1959 | 883 | 723 | 291 | 177 | 1,191 | 2,074 |
| 1960 | 1,093 | 569 | 425 | 89 | 1,083 | 2,176 |
| 1961 | 973 | 46 | 316 | 112 | 474 | 1,447 |
| 1962 | 973 | 848 | 152 | 2,128 | 3,128 | 4,101 |
| 1963 | 1,163 | 113 | 398 | 369 | 880 | 2,043 |
| 1964 | 1,146 | 89 | 320 | 919 | 1,328 | 2,474 |
| 1965 | 727 | 21 | 819 | 54 | 894 | 1,621 |
| 1966 | 967 | 844 | 553 | 891 | 2,288 | 3,255 |
| 1967 | 847 | 216 | 229 | 3,119 | 3,564 | 4,411 |

Source: "Building Permits",
Catalogue Number 64 - 001,
Dominion Bureau of Statistics.

GRANDE PRAIRIE

| | Total Residential | Industrial | Commercial | Institutional & Government | Total Non-Residential | Total Residential & Non-Residential |
|------|----------------------|------------|------------|-------------------------------|--------------------------|--|
| | \$'000 | \$'000 | \$'000 | \$'000 | \$'000 | \$'000 |
| 1959 | 1,017 | 380 | 324 | 363 | 1,067 | 2,084 |
| 1960 | 1,006 | 55 | 328 | 1,143 | 1,526 | 2,532 |
| 1961 | 1,596 | 24 | 323 | 784 | 1,131 | 2,727 |
| 1962 | 2,435 | 42 | 433 | 1,468 | 1,943 | 4,378 |
| 1963 | 2,592 | 287 | 588 | 410 | 1,285 | 3,877 |
| 1964 | 1,300 | 92 | 485 | 1,001 | 1,578 | 2,878 |
| 1965 | 1,372 | 34 | 1,033 | 626 | 1,693 | 3,065 |
| 1966 | 1,331 | 159 | 644 | 1,055 | 1,858 | 3,189 |
| 1967 | 1,074 | 62 | 717 | 330 | 1,109 | 2,183 |

Source: "Building Permits",
Catalogue Number 64 - 001,
Dominion Bureau of Statistics.

LLOYDMINSTER

| | Total Residential | Industrial | Commercial | Institutional & Government | Total Non-Residential | Total Residential & Non-Residential |
|------|----------------------|------------|------------|-------------------------------|--------------------------|--|
| | \$'000 | \$'000 | \$'000 | \$'000 | \$'000 | \$'000 |
| 1959 | 554 | 3 | 494 | 532 | 1,029 | 1,583 |
| 1960 | 570 | 22 | 148 | 342 | 512 | 1,082 |
| 1961 | 683 | 91 | 250 | 522 | 863 | 1,546 |
| 1962 | 762 | 37 | 178 | 154 | 369 | 1,131 |
| 1963 | 813 | 275 | 121 | 796 | 1,192 | 2,005 |
| 1964 | 1,333 | 122 | 705 | 200 | 1,027 | 2,360 |
| 1965 | 1,139 | 66 | 302 | 46 | 414 | 1,553 |
| 1966 | 766 | 215 | 917 | 147 | 1,279 | 2,045 |
| 1967 | 1,375 | 199 | 438 | 2,544 | 3,181 | 4,556 |

Source: "Building Permits",
Catalogue Number 64 - 001,
Dominion Bureau of Statistics.

RED DEER

| | Total Residential \$'000 | Industrial \$'000 | Commercial \$'000 | Institutional & Government \$'000 | Total Non-Residential \$'000 | Total Residential & Non-Residential \$'000 |
|------|--------------------------------|----------------------|----------------------|---|------------------------------------|--|
| 1959 | 3,671 | 678 | 1,262 | 2,698 | 4,638 | 8,309 |
| 1960 | 2,182 | 105 | 2,317 | 1,366 | 3,788 | 5,970 |
| 1961 | 4,340 | 683 | 952 | 945 | 2,580 | 6,920 |
| 1962 | 4,484 | 30 | 2,380 | 3,432 | 5,842 | 10,326 |
| 1963 | 6,608 | 151 | 2,276 | 1,994 | 4,421 | 11,029 |
| 1964 | 3,190 | 408 | 664 | 3,717 | 4,789 | 7,979 |
| 1965 | 2,029 | 795 | 1,782 | 2,417 | 4,994 | 7,023 |
| 1966 | 1,217 | 478 | 503 | 5,792 | 6,773 | 7,990 |
| 1967 | 1,243 | 787 | 793 | 2,954 | 4,534 | 5,777 |

Source: "Building Permits",
 Catalogue Number 64 - 001,
 Dominion Bureau of Statistics.

TABLE VI

VALUE OF RESIDENTIAL AND NON-RESIDENTIAL CONSTRUCTION
IN URBAN CENTRES OF 5,000 POPULATION AND OVER
NORTHERN SASKATCHEWAN, 1959 - 1967

NORTH BATTLEFORD

| | Total Residential \$'000 | Industrial \$'000 | Commercial \$'000 | Institutional & Government \$'000 | Total Non-Residential \$'000 | Total Residential & Non-Residential \$'000 |
|------|--------------------------------|----------------------|----------------------|---|------------------------------------|--|
| 1959 | 1,593 | 12 | 307 | 251* | 570 | 2,163 |
| 1960 | 527 | 20 | 436 | 155 | 611 | 1,138 |
| 1961 | 869 | 60 | 856 | 906 | 1,822 | 2,691 |
| 1962 | 1,402 | 14 | 1,165 | 137 | 1,316 | 2,718 |
| 1963 | 909 | - | - | - | - | 909 |
| 1964 | 1,865 | 147 | 279 | 436 | 862 | 2,727 |
| 1965 | 1,378 | 154 | 226 | 866 | 1,246 | 2,624 |
| 1966 | 806 | 40 | 561 | 291 | 892 | 1,698 |
| 1967 | 645 | 475 | 431 | 480 | 1,386 | 2,031 |

(*) Includes \$1,000 of permits categorized as "others" by the
Dominion Bureau of Statistics for North Battleford.

Source: "Building Permits",
Catalogue Number 64 - 001,
Dominion Bureau of Statistics.

PRINCE ALBERT

| | Total Residential | Industrial | Commercial | Institutional & Government | Total Non-Residential | Total Residential & Non-Residential |
|------|----------------------|------------|------------|-------------------------------|--------------------------|--|
| | \$'000 | \$'000 | \$'000 | \$'000 | \$'000 | \$'000 |
| 1959 | 2,528 | 175 | 412 | 1,105* | 1,692 | 4,220 |
| 1960 | 1,513 | 685 | 685 | 2,003 | 3,373 | 4,886 |
| 1961 | 2,046 | 269 | 507 | 2,753 | 3,529 | 5,575 |
| 1962 | 2,632 | 302 | 762 | 1,877 | 2,941 | 5,573 |
| 1963 | 906 | - | - | - | - | 906 |
| 1964 | 1,625 | 9 | 501 | 693 | 1,203 | 2,828 |
| 1965 | 1,969 | 151 | 907 | 1,976 | 3,034 | 5,003 |
| 1966 | 3,509 | 5,148 | 507 | 1,699 | 7,354 | 10,863 |
| 1967 | 3,349 | 6,301 | 1,485 | 5,026 | 12,812 | 16,161 |

(*) Includes \$7,000 of permits categorized as "others" by the Dominion Bureau of Statistics for Prince Albert.

Source: "Building Permits",
Catalogue Number 64 - 001,
Dominion Bureau of Statistics.

SASKATOON

| | Total Residential | Industrial | Commercial | Institutional & Government | Total Non-Residential | Total Residential & Non-Residential |
|------|----------------------|------------|------------|-------------------------------|--------------------------|--|
| | \$'000 | \$'000 | \$'000 | \$'000 | \$'000 | \$'000 |
| 1959 | 20,082 | 1,404 | 4,117 | 8,602 | 14,123 | 34,205 |
| 1960 | 12,651 | 2,009 | 6,177 | 5,537 | 13,723 | 26,374 |
| 1961 | 14,852 | 1,238 | 2,554 | 7,971 | 11,763 | 26,615 |
| 1962 | 11,642 | 253 | 3,411 | 8,787 | 12,451 | 24,093 |
| 1963 | 12,861 | 1,669 | 4,079 | 5,554 | 11,302 | 24,163 |
| 1964 | 16,854 | 2,459 | 5,439 | 10,713 | 18,611 | 35,465 |
| 1965 | 17,847 | 4,457 | 8,909 | 9,873 | 23,239 | 41,086 |
| 1966 | 15,743 | 2,657 | 14,733 | 14,339 | 31,729 | 47,472 |
| 1967 | 23,017 | 2,215 | 8,592 | 23,193 | 34,000 | 57,017 |

Source: "Building Permits",
Catalogue Number 64 - 001,
Dominion Bureau of Statistics.

TABLE VII

THE PERCENTAGE OF GYPSUM USED IN CEMENT IN CANADA
1958 - 1966

| <u>Year</u> | (Column 1) | (Column 2) | (Column 3) |
|-------------|------------------------------|--|---|
| | Cement Production tons | Gypsum Used in Cement Plants tons | % of Gypsum Per Ton of Cement % |
| 1958 | 6,153,421 | 293,514 | 4.8 |
| 1959 | 6,284,486 | 278,298 | 4.4 |
| 1960 | 5,787,225 | 262,171 | 4.5 |
| 1961 | 6,205,948 | 297,785 | 4.8 |
| 1962 | 6,878,729 | 326,674 | 4.7 |
| | 5 Year Average | | 4.6 |
| 1963 | 7,013,662 | 323,234 | 4.6 |
| 1964 | 7,847,384 | 360,980** | 4.6 |
| 1965 | 8,427,702 | 387,674** | 4.6 |
| 1966 | 8,930,552* | 410,805** | 4.6 |

* Preliminary figure

** Estimates

Source: Column 1. "Statistics of the Mineral Production of Canada, by Provinces",
Dominion Bureau of Statistics.

Column 2. "Gypsum Mines 1963", Catalogue Number 26 - 221,
Dominion Bureau of Statistics.

Note - the 1964 to 1966 figures are estimates,
calculated by using the average value
of 4.6% found in column 3.

Column 3. Alberta Bureau of Statistics.

TABLE VIII

THE APPROXIMATE AMOUNT OF GYPSUM USED IN CEMENT MANUFACTURING
IN ALBERTA, 1958 - 1967

| | (Column 1) | (Column 2) | (Column 3) |
|-------------|--|---|---|
| <u>Year</u> | <u>Alberta Production tons</u> | <u>% of Gypsum (See Table VII) % (est.)</u> | <u>Approximate Amount of Gypsum Used tons</u> |
| 1958 | 635,516 | 4.6 | 29,000 |
| 1959 | 689,854 | 4.6 | 32,000 |
| 1960 | 663,856 | 4.6 | 31,000 |
| 1961 | 677,914 | 4.6 | 31,000 |
| 1962 | 799,030 | 4.6 | 37,000 |
| 1963 | 727,122 | 4.6 | 33,000 |
| 1964 | 727,122 | 4.6 | 33,000 |
| 1965 | 871,738 | 4.6 | 40,000 |
| 1966 | 822,360* | 4.6 | 38,000 |
| 1967 | 880,586* | 4.6 | 41,000 |

* Preliminary Figure - Dominion Bureau of Statistics.

SOURCE: Column 1. "Cement Manufacturers",
Catalogue Number 44 - 204, Table 2,
Dominion Bureau of Statistics.

Column 2. & 3. Estimates - Alberta Bureau of
Statistics,
Based on Table VII.

TABLE IX

COMPARISON OF TRANSPORTATION COSTS
(Crushed Gypsum)

| <u>EDMONTON LOCATION:</u> | (Column 1) | (Column 2) | (Column 3) |
|--|----------------------|-------------------------|---------------------|
| | Amaranth Manitoba | Gypsumville Manitoba | Windermere B. C. |
| | \$ | \$ | \$ |
| Average cost at mine (per ton) (Table No. XI) | 2.47 | 2.47 | 3.00 |
| Rail Transportation Charges per ton to Edmonton | <u>9.60</u> | <u>9.80*</u> | <u>2.80</u> |
| Total Cost per ton Delivered at Edmonton | <u>12.07</u> | <u>12.27</u> | <u>10.80</u> |

NOTE: * - At present there is no rail rate available between Gypsumville Manitoba and Edmonton. The rate is assumed to be the same as from Gypsumville to Calgary, \$9.80 per ton.

| <u>CALGARY LOCATION:</u> | (Column 1) | (Column 2) | (Column 3) |
|---|----------------------|-------------------------|---------------------|
| | Amaranth Manitoba | Gypsumville Manitoba | Windermere B. C. |
| | \$ | \$ | \$ |
| Average cost at mine (per ton) (Table No. XI) | 2.47 | 2.47 | 3.00 |
| Rail Transportation Charges per ton to Calgary | <u>9.60</u> | <u>9.80</u> | <u>5.20*</u> |
| Total Cost per ton Delivered at Calgary | <u>12.07</u> | <u>12.27</u> | <u>8.20</u> |

* No. published rate - estimate only

Source of Costs: Rail Transportation, Alberta Freight Bureau.

COMMENTS: 1. It is assumed handling charges are the same.

2. Freight rates are for full car lots.

Car Capacity - 80,000 - 100,000 lbs. Car Capacity - 100,000 lbs. up
Minimum 72,000 lbs. Minimum 90,000 lbs.

3. It costs \$2.60 (per ton) more to ship raw gypsum from Windermere to Edmonton than Windermere to Calgary. (see Column 3, Table IX) The present freight rate for plain, packaged, or loose gypsum products between Calgary and Edmonton is \$4.40 per ton with a minimum weight of 120,000 lbs.

TABLE X

CRUDE GYPSUM UNLOADED AT RAILWAY FREIGHT STATIONS IN ALBERTA
1959 - 1967

| <u>Year</u> | <u>Crude Gypsum Unloadings</u> tons |
|----------------|--|
| 1959 | 96,000 |
| 1960 | 86,000 |
| 1961 | 104,000 |
| 1962 | 104,000 |
| 1963 | 113,000 |
| 1964 | 104,000 |
| 1965 | 102,000 |
| 1966 | 113,000 |
| 1967 | 102,000 (1) |

SOURCE: "Railway Freight Traffic",
Table 10,
Catalogue Number 52 - 205,
Dominion Bureau of Statistics.

SOURCE: (1)
"Railway Freight Traffic",
Catalogue Number 52 - 002,
Dominion Bureau of Statistics.

CANADIAN OCCURRENCES AND PRODUCTION

OF GYPSUM AND ANHYDRITE

Gypsum deposits occur in all provinces except Saskatchewan and Prince Edward Island. There is no production in Alberta or Quebec.

Canada is the world's third largest producer of gypsum with an output of approximately half that of the United States. Producers shipments of gypsum were 3.9 million tons in 1958 with a high of 6.0 million tons in 1963.

The average for the 6 year period (1958 - 1963) was 5.2 million tons of gypsum shipped per year. (See Table XI).

TABLE XI

PRODUCERS SHIPMENTS OF GYPSUM, BY PROVINCES
1958 - 1963

| | 1958 | | 1959 | | 1960 | |
|------------------|--------------|------------|--------------|------------|--------------|------------|
| | tons '000 | \$ '000 | tons '000 | \$ '000 | tons '000 | \$ '000 |
| Newfoundland | 36.3 | 145 | 37.7 | 149 | 34.3 | 142 |
| Nova Scotia | 3,149.7 | 3,259 | 5,036.4 | 6,463 | 4,490.4 | 7,515 |
| New Brunswick | 105.7 | 171 | 98.3 | 133 | 90.9 | 267 |
| Ontario | 425.7 | 1,060 | 412.1 | 1,017 | 355.6 | 871 |
| Manitoba | 176.1 | 343 | 200.1 | 350 | 122.1 | 366 |
| British Columbia | 70.5 | 211 | 94.0 | 282 | 112.4 | 337 |
| TOTAL | 3,964.1 | 5,189 | 5,878.6 | 8,394 | 5,205.7 | 9,499 |

| | 1961 | | 1962 | | 1963 | |
|------------------|--------------|------------|--------------|------------|--------------|------------|
| | tons '000 | \$ '000 | tons '000 | \$ '000 | tons '000 | \$ '000 |
| Newfoundland | 40.7 | 102 | 83.9 | 285 | 322.3 | 766 |
| Nova Scotia | 4,113.2 | 5,694 | 4,451.1 | 7,114 | 4,910.5 | 8,229 |
| New Brunswick | 85.3 | 137 | 91.8 | 162 | 80.5 | 139 |
| Ontario | 425.3 | 992 | 435.1 | 1,008 | 439.2 | 1,225 |
| Manitoba | 122.2 | 367 | 122.8 | 339 | 131.8 | 395 |
| British Columbia | 153.3 | 460 | 147.9 | 444 | 161.0 | 483 |
| TOTAL | 4,940.0 | 7,751 | 5,332.9 | 9,350 | 6,045.3 | 11,237 |

6 Year
Weighted Average
Value per ton
1958-1963
\$

| | |
|------------------|------|
| Newfoundland | 2.86 |
| Nova Scotia | 1.46 |
| New Brunswick | 1.83 |
| Ontario | 2.48 |
| Manitoba | 2.47 |
| British Columbia | 3.00 |

Note: Value F. O. B. Shipping Point.

SOURCE: "The Gypsum Mining Industry" - Table 2, Catalogue No. 26-221,
Dominion Bureau of Statistics.

TABLE XII

FACTORY SHIPMENTS OF GYPSUM PRODUCTS TO CANADIAN CONSUMERS

1 9 6 1 - 1 9 6 7

thousand sq. ft.

| | <u>Gypsum Wallboard</u> | <u>Gypsum Lath</u> | <u>Gypsum Sheathing</u> | <u>Gypsum Plasters</u> |
|------|-----------------------------|------------------------|-----------------------------|----------------------------|
| 1961 | 432,166 | 265,349 | 11,479 | 244 |
| 1962 | 470,583 | 259,151 | 9,581 | 250 |
| 1963 | 480,222 | 239,318 | 11,814 | 232 |
| 1964 | 585,184 | 283,732 | 12,176 | 241 |
| 1965 | 568,119 | 238,240 | 13,506 | 243 |
| 1966 | 615,385 | 217,862 | 15,442 | 238 |
| 1967 | 670,766 | 194,203 | 16,756 | 186 |

SOURCE: Dominion Bureau of Statistics,
Catalogue Number 44 - 003,
"Gypsum Products".

TABLE XIII

CANADIAN HOUSING STARTS
AND PRAIRIE PROVINCES SHARE OF MARKET

(thousands of starts)

| | <u>Canada</u> | <u>Percent of Total</u> | | |
|------|---------------|-------------------------|---------------------|----------------|
| | | <u>Manitoba</u> | <u>Saskatchewan</u> | <u>Alberta</u> |
| 1956 | 127.3 | 4.1 | 3.0 | 8.4 |
| 1957 | 122.3 | 3.1 | 3.7 | 9.1 |
| 1958 | 164.6 | 3.9 | 3.2 | 10.0 |
| 1959 | 141.3 | 4.7 | 4.6 | 9.2 |
| 1960 | 108.9 | 4.7 | 4.0 | 7.7 |
| 1961 | 125.6 | 4.5 | 4.1 | 10.2 |
| 1962 | 130.1 | 3.6 | 4.1 | 11.0 |
| 1963 | 148.6 | 4.3 | 4.2 | 8.3 |
| 1964 | 165.7 | 4.0 | 4.3 | 7.3 |
| 1965 | 166.6 | 3.6 | 4.5 | 6.9 |
| 1966 | 134.5 | 3.9 | 4.3 | 7.0 |
| 1967 | 164.1 | 3.6 | 4.4 | 7.7 |

SOURCE: "New Residential Construction",
Catalogue Number 64 - 002,
Dominion Bureau of Statistics.

USES OF GYPSUM AND ANHYDRITE (1)

(a) Uses of Gypsum:

Gypsum is hydrated calcium sulfate which, when pure, contains 2.57 percent calcium oxide, 46.50 percent sulfur trioxide and 20.93 percent water, (percentage by weight).

The outstanding property of gypsum is its ability to lose about three-quarters of its water on heating to form hemihydrate. When water is added to the hemihydrate, a plaster is formed which may be moulded to any desired shape and which on setting, will revert to gypsum. This plaster has the advantage of being chemically inert and fire resistant.

The two major uses of calcined gypsum are in the manufacture of plasterboard and portland cement. The addition of 4 or 5 percent gypsum to cement causes retardation of the setting time.

Calcined gypsum is also used in the manufacture of lightweight gypsum blocks, high-temperature lagging and fire-proffing, acoustic plaster, dental and surgical plasters, plaster of paris, in the dehydration of oil and in filtering.

As a filler, gypsum may be used in asbestos and other insulating boards, insecticides, drugs, and cotton goods; as an alternative to kaolin in paper. The base for many paints is gypsum. It is used in the glass and ceramic industry. Gypsum is used for the purification of water, and in chalks and crayons.

A number of chemicals may be manufactured from gypsum, such as sulfuric acid, calcium sulfide, elemental sulfur, and lime.

Gypsum is used as a soil conditioner in many parts of the world.

(b) Uses of Anhydrite:

Anhydrite is the anhydrous form of calcium sulfate, and when pure, contains 41.19 percent calcium oxide and 58.81 percent sulfur trioxide, (percentage by weight). This mineral is commonly thought of as being of no value -- perhaps because of its lack of use in North America -- but it has wide applications in Europe.

The major use of anhydrite is in the manufacture of sulfuric acid and cement clinker.

Some plasters require the addition of anhydrite to accelerate the setting time. The resulting plaster has great hardness, and a shorter drying time than gypsum plasters. The inclusion of colored anhydrite aggregate in the plaster provides a cheap decorative alternative for tiles, marble and terrazo.

Finely ground, anhydrite is used in the manufacture of ammonium sulfate fertilizers. There is no market for anhydrite fertilizer in Western Canada because it is a natural component of the soil.

It serves as a filler in roofing felts and paints.

- (1) G. J. S. Govett - "Occurrence and Stratigraphy of Some Gypsum and Anhydrite Deposits in Alberta".

SOURCE: Research Council of Alberta, 1961,
Bulletin 7, Pages 6 - 8.

KNOWN GYPSUM DEPOSITS IN ALBERTA

Gypsum occurs in large quantities at several localities in Alberta. No surface deposits of gypsum have yet been discovered in areas readily accessible by road or rail. Anhydrite is usually found in conjunction with gypsum and is somewhat harder than gypsum. The map on page 22 indicates the location of known gypsum deposits.

1. Peace Point --

The gypsum at Peace Point is extremely pure, is located at the surface and is covered by a thin overburden. The deposit which varies between a thickness of 80 and 10 feet stretches for 17 miles along both sides of the Peace River. Conservative estimates place the reserves of gypsum in this deposit at well over one billion tons.

Peace Point is connected by road to Fort Smith in the North West Territories, which in turn is joined by an all year road to Hay River on the MacKenzie Highway. Highway No. 58 will join High Level (on the MacKenzie Highway) to Peace Point and Sweetgrass Landing. At present this highway (No. 58) is completed within approximately 65 miles of Wood Buffalo National Park. Access by water is possible from the northern terminus of the Northern Alberta Railway at Fort McMurray via the Athabasca and Peace River.

2. Salt and Slave River --

Gypsum deposits in the Salt and Slave River areas appear quite thin but are of good quality. Outcrops of gypsum are found at the surface by the river, but are found deeper as the distance westerly, away from the river, is increased. The exact reserves are unknown, but the deeper the deposit is beneath the surface, the thicker it becomes.

The nearest settlements to the Salt and Slave River deposits are Fort Fitzgerald in Alberta and Fort Smith in the Northwest Territories. Fort Fitzgerald is accessible by barge from Fort McMurray via the Athabasca River, Lake Athabasca and Slave River. Rapids along the Slave River, between Fort Fitzgerald and Fort Smith necessitate a 14 mile portage in the summer but in the winter a road connects these two settlements with the town of Hay River in the Northwest Territories. Hay River is joined to Grimshaw, Alberta by the MacKenzie Highway. From Grimshaw to Edmonton there is a paved highway and a railway.

3. McMurray --

The gypsum in this deposit varies from pure to fairly pure.

In the vicinity of Fort McMurray the deposit is approximately 35 feet thick and is covered by a 500 foot overburden. North from Fort McMurray the deposit is nearer to the surface, but at the same time is somewhat thinner. The size of the reserves is only second to that of Peace Point.

A single line railway from Edmonton has its terminus at Fort McMurray and a new all-weather highway has been completed between Fort McMurray and Edmonton.

4. Mowitch Creek --

The Mowitch Creek deposit is considered to be pure, but not large in area. It is about 200 feet thick. The exact reserves are unknown. Mowitch Creek lies one-half mile inside the northern boundary of Jasper National Park. At present, under existing federal regulations, development would not be possible.

5. Featherstonhaugh Creek --

Featherstonhaugh is a surface deposit. Samples have indicated a very high grade of gypsum; however the exact quantity of reserves is unknown.

A public road terminates just north of Gustave Flats. Recently the ferry across the Smokey River was replaced by a bridge. The distance between Featherstonhaugh Creek and the bridge is 50-60 miles. The distance between the bridge across the Smokey River and Entrance is 95-100 miles. Loos, British Columbia, a stop on the Canadian National Railway line from Prince Rupert to Edmonton, is about 40 miles south west from the deposit.

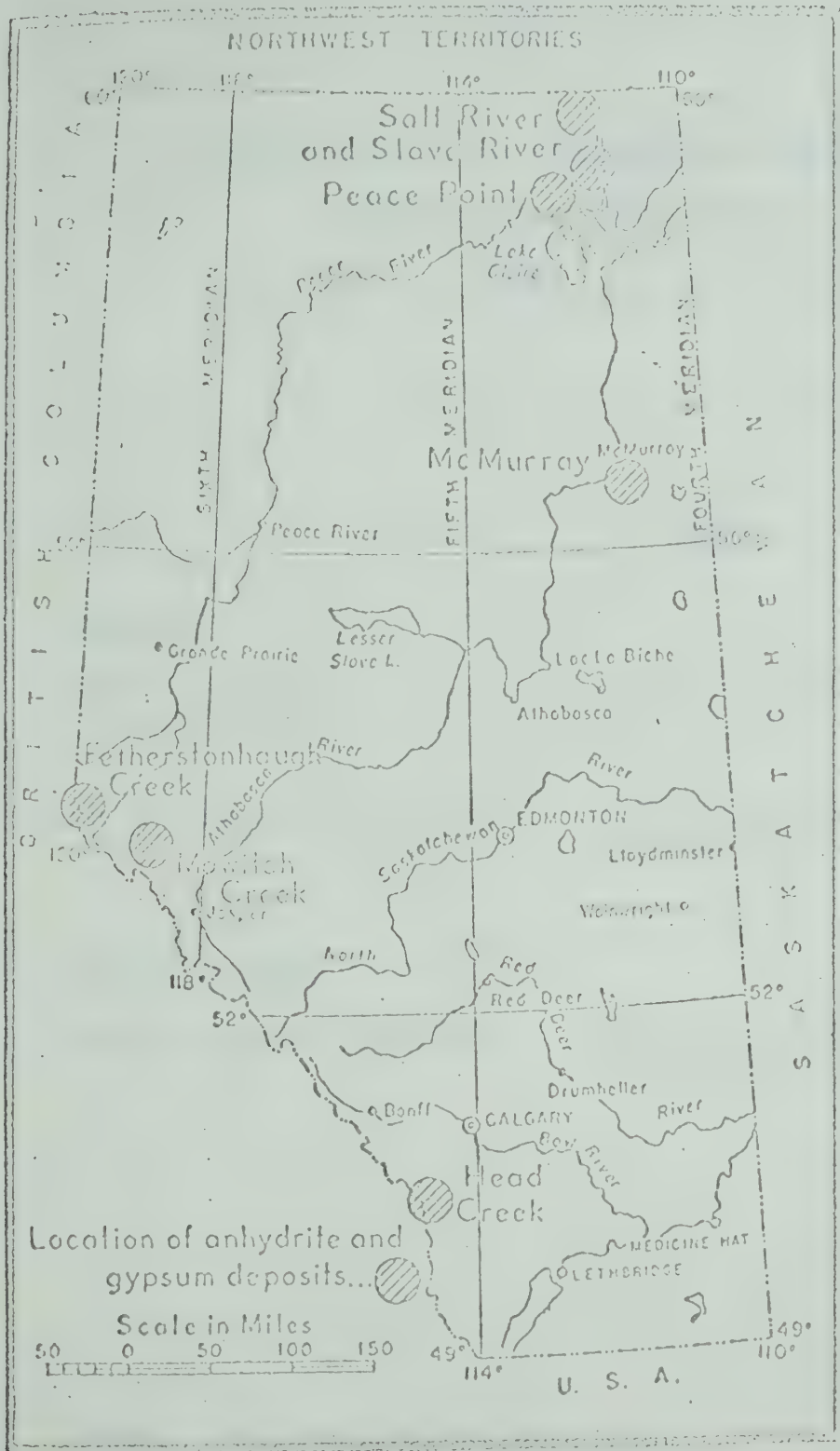
The Alberta Resources Railway, as well as a forestry trunk road go as far north as the mouth of the Muskey River.

6. Head Creek --

The Head Creek gypsum deposit contains about 65-70% gypsum, is relatively impure, and is therefore unlikely to be of much interest for present uses.

Access may be gained by the Highwood River road west from Longview (about 15 miles west of High River) as far as Flat Creek and then by truck trail along Flat Creek to Head Creek. The distance by road from Head Creek to the Canadian Pacific Railway at Longview is 30-35 miles. The gypsum deposit lies about 4 miles west of the confluence of Head and Flat Creeks.

GYPSUM AND ANHYDRITE DEPOSITS IN ALBERTA



SOURCE: Research Council of Alberta, Bulletin 7.

TABLE XII

LIST OF FIRMS IN THE GYPSUM MINING INDUSTRY,
MANITOBA AND BRITISH COLUMBIA
1963

| | <u>Head Office</u> | <u>Plant Location</u> |
|--|--|---------------------------|
| <u>MANITOBA</u> | | |
| Domtar Construction Materials Ltd., | 1 Place Ville Marie, Montreal, Quebec. | Gypsumville |
| Western Gypsum Products Ltd., | 2650 Lakeshore Hwy., Clarkson, Ontario. | Amaranth |
| <u>BRITISH COLUMBIA</u> | | |
| Western Gypsum Products Ltd., | 2650 Lakeshore Hwy., Clarkson, Ontario. | Windermere |

SOURCE: "The Gypsum Mining Industry",
Catalogue Number 26 - 221,
Dominion Bureau of Statistics.

REFERENCES

- Cameron, A. E. - The Gypsum Deposits in the Peace River:
Research Council of Alberta,
Tenth Annual Report - 25, 1929, Pp. 39-47.
- Davis, John - Mining & Mineral Processing in Canada:
Royal Commission on Canada's Economic
Prospects, 1957.
- Govett, G. J. S. - Occurrence and Stratigraphy of Some Gypsum
& Anhydrite Deposits in Alberta:
Research Council of Alberta,
Bulletin 7, 1961, Pp. 62.
- Govett, G. J. S. &
Byrne, P. J. S. - Industrial Minerals of Alberta:
Research Council of Alberta,
Report 58 - 2, 1958, Pp. 42-66.
- Government and Business Publications --
- Alberta Industry and Resources: Alberta Bureau of Statistics,
1968.
- Report on the Royal Commission on the Development of Northern Alberta,
1958.

